

WHAT IS CLAIMED IS:

1. An optical multi-beam scanning device,
comprising:

a plurality of light sources;

5 pre-deflection optical units for giving a predetermined
property to light beams from the light sources, the
pre-deflection optical units corresponding to the light
sources, respectively;

an optical path synthesizing member for aligning optical
10 paths of the light beams from all or some of the light sources
in a horizontal scanning direction after the pre-deflection
optical units give the predetermined properties to the light
beams or while giving them to the light beams;

an excessive light processing member having a
15 multi-stage taper constitution with a plurality of taper
surfaces having different tilt angles for reflecting
excessive light emitted from an excessive light emitting
surface which is not an incident surface nor an emitting surface
of the optical path synthesizing member; and

20 a light deflecting device for deflecting the light beams
from the pre-deflection optical units corresponding to the
light sources to the horizontal scanning direction due to
reflection from one surface.

25 2. The optical multi-beam scanning device according
to claim 1, wherein the excessive light processing member
has the taper surfaces with different angles whose number
is the same as that of the optical paths to be aligned by

itself.

3. The optical multi-beam scanning device according to claim 1, wherein the tilt angles of all the taper surfaces in the excessive light processing member are set so that reflected light from the taper surfaces does not enter the excessive light emitting surface of the optical path synthesizing member.

4. The optical multi-beam scanning device according to claim 1, wherein the tilt angles of all the taper surfaces in the excessive light processing member are set so that reflected light from the taper surfaces reenter the excessive light emitting surface of the optical path synthesizing member, and the reentered light beams have predetermined angle for passing through an upper or lower portion of an optical part present in a direction where the light beams emitted from the optical path synthesizing member advances.

5. The optical multi-beam scanning device according to claim 1, wherein the tilt angles of some taper surfaces in the excessive light processing member are set so that reflected light from the taper surfaces does not enter the excessive light emitting surface of the optical path synthesizing member, and the tilt angles of the other taper surfaces are set so that the reflected light from the taper surfaces reenters the excessive light emitting surface of the optical path synthesizing member and the reentered light

beams have predetermined angles for passing through an upper or lower portion of an optical part present in a direction where the light beams emitted from the optical path synthesizing member advances.

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6. An optical multi-beam scanning device, comprising:

a plurality of light sources;

pre-deflection optical units for giving a predetermined
10 property to light beams from the light sources, the pre-deflection optical units corresponding to the light sources, respectively;

an optical path synthesizing member for aligning optical paths of the light beams from all or some of the light sources
15 in a horizontal scanning direction after the pre-deflection optical units give the predetermined properties to the light beams or while giving them to the light beams;

an excessive light processing member having an absorbing surface roughly parallel with an excessive light emitting
20 surface for absorbing excessive light emitted from the excessive light emitting surface which is not an incident surface nor an emitting surface of the optical path synthesizing member; and

a light deflecting device for deflecting the light beams
25 from the pre-deflection optical units corresponding to the light sources to the horizontal scanning direction due to reflection from one surface.

7. The optical multi-beam scanning device according to claim 6, wherein the absorbing surface of the excessive light processing member is formed by adhering a light absorbing sheet to the absorbing surface.

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8. The optical multi-beam scanning device according to claim 6, wherein the absorbing surface of the excessive light processing member has a repeated convexo-concave pattern for reflecting and absorbing the excessive light.

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9. The optical multi-beam scanning device according to claim 8, wherein the convexo-concave pattern has a shape which reflects excessive incident light three times and returns the excessive light to the excessive light emitting surface of the optical path synthesizing member.

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10. The optical multi-beam scanning device according to claim 8, wherein

the convexo-concave pattern has a shape which reflects excessive incident light so that the excessive incident light recedes more and more from the excessive light emitting surface of the optical path synthesizing member every time of the reflection of the excessive incident light.

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11. An optical multi-beam scanning device, comprising:

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a plurality of light sources;

pre-deflection optical units for giving a predetermined

property to light beams from the light sources, the pre-deflection optical units corresponding to the light sources, respectively;

5 an optical path synthesizing member for aligning optical paths of the light beams from all or some of the light sources in a horizontal scanning direction after the pre-deflection optical units give the predetermined properties to the light beams or while giving them to the light beams;

10 an excessive light processing member having repeated local patterns for dispersing excessive light emitted from an excessive light emitting surface which is not an incident surface nor an emitting surface of the optical path synthesizing member; and

15 a light deflecting device for deflecting the light beams from the pre-deflection optical units corresponding to the light sources to the horizontal scanning direction due to reflection from one surface.

20 12. The optical multi-beam scanning device according to claim 11, wherein the local patterns have a semicylindrical shape and are repeated on a straight line or an arc.

25 13. The optical multi-beam scanning device according to claim 11, wherein the local patterns have a hemispherical shape and are repeated on a plane or a sphere.

14. The optical multi-beam scanning device according to claim 1, wherein a member for regulating the position of

the optical path synthesizing member functions also as the excessive light processing member.

15 15. The optical multi-beam scanning device according to claim 6, wherein a member for regulating the position of the optical path synthesizing member functions also as the excessive light processing member.

10 16. The optical multi-beam scanning device according to claim 11, wherein a member for regulating the position of the optical path synthesizing member functions also as the excessive light processing member.

15 17. An image forming apparatus, comprising:
the optical multi-beam scanning device according to claim 1; and
photoreceptors having surfaces to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.

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18. An image forming apparatus, comprising:
the optical multi-beam scanning device according to claim 6; and
photoreceptors having surfaces to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.

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19. An image forming apparatus, comprising:

the optical multi-beam scanning device according to claim 11; and

photoreceptors having surfaces to be scanned on which latent images are formed based on light beams from the optical
5 multi-beam scanning device.